

SELECTED BIBLIOGRAPHY ON APPLICATIONS OF ELECTRICITY IN FISHERY SCIENCE

Marine Biological Laboratory
LIBRARY
JUN 14 1954
WOODS HOLE, MASS.



SPECIAL SCIENTIFIC REPORT-FISHERIES No.127

UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

Explanatory Note

The series embodies results of investigations, usually of restricted scope, intended to aid or direct management or utilization practices and as guides for administrative or legislative action. It is issued in limited quantities for the official use of Federal, State or cooperating Agencies and in processed form for economy and to avoid delay in publication.

United States Department of the Interior, Douglas McKay, Secretary,
Fish and Wildlife Service, John L. Farley, Director

SELECTED BIBLIOGRAPHY ON THE APPLICATIONS OF ELECTRICITY
IN FISHERY SCIENCE

by

Vernon C. Applegate
Fishery Research Biologist

Paul T. Macy
Fishery Research Biologist

and

Virgil E. Harris
Electronics Scientist

Special Scientific Report: Fisheries No. 127

Washington, D. C.
April, 1954

CONTENTS

	Page
Part I. Published reports	3
Part II. Typewritten and processed reports and other material having a restricted distribution . .	47
Part III. Patents granted by the United States Patent Office	51
Acknowledgments	55

SELECTED BIBLIOGRAPHY ON THE APPLICATIONS OF ELECTRICITY

IN FISHERY SCIENCE

Applications of electricity in commercial fishing, in fish-salvage operations, and as a research tool are growing rapidly in importance. Unfortunately, it has been difficult for investigators to review progress and accomplishments in this field since the literature, although fairly extensive, is widely scattered. Furthermore, knowledge of a rather complex array of technical subjects in (among others) the fields of physiology, fishery biology, electronics, and electrical engineering has been required for the development of successful applications. Investigators have, therefore, been hampered frequently by a lack of familiarity with the literature outside their immediate field of specialization. It is the purpose of this publication to present a selected list of technical, semi-popular, and popular reports, both published and unpublished, which may prove useful to those who are attempting to apply electricity to a specific fishery problem.

This bibliography includes reports appearing through the calendar year 1953 which are directly or indirectly related to the application of electric current in or to the water for the purpose of influencing or controlling fish movement or for capturing fishes or other aquatic organisms. Similar uses of light and sound are not included. Coverage of the literature on fundamental researches of the reactions of fishes to electrical stimuli is comprehensive. A selection of references in the general field of electrophysiology and on the reactions of organisms other than fishes to electrical stimulation is included. Further information on the reactions of plant and animal tissues and of whole organisms (other than fishes) to electrical stimuli may be had by consulting extensive bibliographies presented in the following papers cited in this report: Gerard 1942; Scheminzky 1923; Scheminzky, Scheminzky, and Bukatsch 1941; and Wallengren 1903a.

Coverage of technical and popular accounts of specific applications of electricity in fishery science is likewise comprehensive; both engineering and biological considerations are contained in some of these reports. Further selected reports have been included which may be of aid in instrumentation or which describe useful test instruments. A few papers are cited which discuss the general subject of electrostatic fields; others describe the characteristics of electrical fields in fluid media. Articles dealing specifically with the characteristics of electrical fields in natural waters and the modifying effects of varying natural conditions on these fields appears non-existent. Some information may be gleaned, however, from several of the reports cited herein which are concerned primarily with other topics.

In addition to the reference material previously indicated, a separate list is presented of patents granted by the United States

Patent Office which are pertinent to the subject of this report. This list is the product of an investigation conducted by the legal firm retained by Cook Research Laboratories, Inc., Chicago, Illinois, while under contract to the Fish and Wildlife Service. Presumably it records, among the several arts included, the most significant patents granted for "fish screens" and similar devices through the calendar year 1950. A subsequent search indicated that no further patents of this type were granted at least through 1952.

Nearly all of the citations presented have been checked for accuracy by comparison with the original articles or with suitable reproductions (photostats, microfilms,); five papers for which originals could not be located were checked against typewritten "record" copies. Those citations not verified by one of the two procedures are identified by an asterisk (*). Transliterations and translations of citations in Russian and Japanese have been verified by experts in those languages.

Several inconsistencies that will be apparent in the method of citation have been introduced to facilitate the location of the periodicals involved. City of publication is not usually given. It is included, however, for those foreign journals that are entered in the catalogs of certain libraries under place of publication. For some trade journals and non-technical publications, the date of the particular issue cited is given since that information is frequently more helpful than a knowledge of volume and issue number.

Following citations, references are given to known abstracts, summaries, reviews, reprintings, and available translations. Most summaries, reviews, and reprintings indicated in these annotations are not cited elsewhere in the body of the bibliography. Abstract systems referred to are as follows:

- (1) Biological Abstracts, University of Pennsylvania, Phila., Pa.
- (2) Commercial Fisheries Abstracts, U. S. Dept. of the Interior, Fish and Wildlife Service, Washington, D. C.
- (3) World Fisheries Abstracts, Food and Agriculture Organization of the United Nations, Rome, Italy.

Desirable as it might be to subdivide this bibliography into sections under various subjects, that procedure proved impractical. Many of the references deal with a considerable diversity of subject matter. Any attempt at subdivision accordingly would entail an unreasonable amount of repetition or cross-referencing.

PART I

Published reports

Abe, Noboru

1935. Galvanotropism of the catfish: Parasiluris asotus (Linné).
The Sci. Repts. of the Tôhoku Imperial Univ. (Sendai, Japan),
Fourth Series (Biology), Vol. 9, No. 4, pp. 393-406.

Biol. Abstr. 5573, 1936.

Adler, Peter

1932. Die Beeinflussung der Galvanotaxis und Galvanonarkose
bei Fischen durch Narkotica und Coffein.
Pflügers Arch. f. d. ges. Physiol., Bd. 230, Ss. 113-128.

Adler, Peter, and Claudia Hradecky

1936. Die Galvanonarkose als Prüfmittel für den Wirkungsverlauf
von Hypnoticis und Narcoticis beim Frosch.
Naunyn-Schmiedebergs Arch. f. Experiment. Pathol. u. Pharmakol.,
Bd. 181, Hefte 5 u. 6, Ss. 541-552.

Biol. Abstr. 8536, 1937.

Alliaud, Charles, and Fr. Vlès.

1911. Électrocution des poissons et stabilité hydrostatique.
Comptes Rendus hebdom. Acad. des Sci. (Paris), Tome 152,
pp. 1627-1629.

Anonymous

- 1921a. An electric fish barrage.
Pacif. Marine Review, Vol. 18, No. 10 (Oct. 1921), p. 575.

- 1921b. Electric fish barrage.
Literary Digest, Vol. 71, No. 9, p. 23.

1922. Electric fish screen.
Calif. Fish and Game, Vol. 8, No. 2, p. 120.

1923. Electric fishstops.
Washington Dept. of Fisheries and Game, 1st Bien. Rept. of
State Supervisor of Game and Game Fish, 1921-1922, pp. 23-24.

Anonymous (continued)

- 1926a. A recent experiment with electric fish screens.
Pacif. Fisherm., Vol. 24, No. 12 (Nov. 1926), pp. 13-14.
- 1926b. Electricity forces fish to use safety ladders.
Pop. Mech., Vol. 46, No. 5 (Nov. 1926), p. 733.
1929. Shocking fish as a hydro-plant aid.
Power Plant Eng., Vol. 33, No. 1 (Jan. 1, 1929), p. 75.
- 1930a. Angle elektrisch! Aber nur mit Erlaubnis.
Allg. Fischerei-Zeitung, Jahrg. 55, Nr. 22, S. 364.
- 1930b. Fish screen research sees further progress.
Pacif. Fisherm., Vol. 28, No. 4, pp. 17-18.
1932. Electric fish screen gives effective protection.
Electrical West, Vol. 68, No. 5 (May 1932), p. 250.
1934. Versuche mit elektrischem Fischen.
Fischerei-Zeitung, Bd. 37, Nr. 43, S. 729.
1936. Trapping eels by electricity; experiments in Northern Ireland.
Fish Trades Gaz., Vol. 54, No. 2763 (May 9, 1936), p. 25.
1942. Burkey electric fish screen installed by Sierra Pacific.
Electrical West, Vol. 89, No. 3 (Sept. 1942), p. 92.
- 1945a. An electronic fence for fish.
Westinghouse Engineer, Vol. 5, No. 5, p. 147.
- 1945b. Electric fence for fish.
Electronics Digest, No. 2, p. 34.
- 1945c. Electronic fence keeps fish out of power canal.
Power, Vol. 89, No. 5 (May 1945), p. 322.

Anonymous (continued)

*1945d. Fence for fish.

Westinghouse Newsfront, Vol. 1, No. 4 (July 1945), p. ?.

1946. Electronic control of fish fence.

Electronics, Vol. 19, No. 3 (Mar. 1946), p. 164.

1947. Charged screens prevent mass destruction of fish.

Civil Engineering, Vol. 17, No. 9 (Sept. 1947), Vol. p. 535.

1949a. Electric screen diverts fish from hydro plant.

Electrical World, Vol. 131, No. 1 (Jan. 1, 1949), p. 56.

1949b. Fiske med lys og elektrisitet.

Fiskets Gang (Bergen), 35 årg., Nr. 44 (Nov. 10, 1949),
p. 508.

1949c. Norwegians develop new electric whale gun.

Foreign Commerce Weekly, Vol. 36, No. 11, p. 34.

*1949d. Om at Lokke Fisk i Garnet.

Fiskeribladet, 41st Yr., No. 8, p. 164.

FAO World Fish. Abstr., Mar.-Apr. 1950.

1949e. Revolution in fishing technique; Electric method prospects
for herring operations.

The Fishing News (Gt. Brit.), Vol. 37, No. 1906 (Oct. 22,
1949), p. 12.

FAO World Fish. Abstr., Jan.-Feb. 1950.

1949f. Tubes guide fish.

Electronics, Vol. 22, No. 8 (Aug. 1949), p. 154.

1950a. Catching fish by electricity.

Discovery (London), Vol. 11, No. 1 (Jan. 1950), p. 29.

Comments on development of a combination fish pump and
electrofishing device described by Chernigin 1949.

Anonymous (continued)

1950b. Control of fish schools by electronics.

West. Fisheries, Vol. 39, No. 6 (Mar. 1950), pp. 48-49.

1950c. Electric control of fish behavior.

Pacif. Fisherm., Vol. 48, No. 13, pp. 49-50.

FAO World Fish. Abstr., May-Jun. 1952.

1950d. Electrical fishing experiments without a net.

U. S. Dept. Int., Fish and Wildl. Serv., Comm. Fish. Rev.,
Vol. 12, No. 7, pp. 51-52.

Text reprinted under same title in: Comm. Fish. Abstr.,
Vol. 3, No. 12, p. 9.

1950e. Electrical stimulation of fish in sea water.

Calif. Dept. of Fish and Game, Marine Res. Comm., Calif.
Coop. Sardine Res. Program, Prog. Rept. 1950, pp. 46-47.

1950f. Elektrofischerei im Meere?

Fischereiwelt, Jahrg. 1, Heft 3, Ss. 33-37.

A symposium composed of the following articles:

- (1) Die Anwendung elektrophysiologischer Wirkungen für
den Fischfang im Meere, by H. Peglow, pp. 33-34;
- (2) Erfahrungen mit der Elektrofischerei in Binnen-
gewässern, by W. Denzer, pp. 34-35;
- (3) Elektrische Waltötung, by Kurt Schubert, pp. 35-36;
- (4) Zur Praxis der elektrischen Waltötung, by W. Reichert,
pp. 36-37.

Refer to following citations for English versions of these
articles: Denzer 1949, Peglow 1949, Reichert 1949, and
Schubert 1949.

1950g. Fish population is tabulated scientifically [with "electric
shocking machine"].

Pop. Mech., Vol. 93, No. 5 (May 1950), p. 78.

Anonymous (continued)

- 1950h. The application of electro-physiological effects for fishing in the sea; a new method now being tested in Germany. Peruvian Times, Special Fisheries Number, Dec. 1-8, 1950, p. 32.

Typewr. copy of article on file, Branch of Fishery Biology, Fish and Wildl. Serv.

- 1951a. Catching tuna with electrified hooks.
U. S. Dept. Int., Fish and Wildl. Serv., Comm. Fish. Rev., Vol. 13, No. 10, p. 25.

Summary of a report in: *Dansk Fiskeritidende, Sept. 14, 1951. Text of summary reprinted under title "German Federal Republic catching tuna with electrified hooks" in: Comm. Fish. Abstr., Vol. 5, No. 1, p. 3.

- 1951b. Electric fishing net predicted for ocean.
Sci. News Letter, Vol. 60, No. 8, p. 127.

Reprinted under title "Electric fishing net is predicted" in: Sci. Digest, Vol. 30, No. 5, p. 44. 1951.

- 1951c. Electro-fishing used to reduce coarse rough fish in Emmer River.
U. S. Dept. Int., Fish and Wildl. Serv., Comm. Fish. Rev., Vol. 13, No. 1, pp. 54-55.

- 1951d. Fishing with electric current.
Fisheries Newsletter (Australia), Vol. 10, No. 6, pp. 11-13.

- 1951e. Status of electrical fishing experiments.
U. S. Dept. Int., Fish and Wildl. Serv., Comm. Fish. Rev., Vol. 13, No. 1, pp. 51-52.

- 1951f. Use of shielding cable in electric fish-shocking devices.
U. S. Dept. Int., Fish and Wildl. Serv., Prog. Fish-Cult., Vol. 13, No. 2, p. 98.

Anonymous (continued)

- 1951g. Vessel equipped with deep-sea electrical fishing device.
U. S. Dept. Int., Fish and Wildl. Serv., Comm. Fish. Rev.,
Vol. 13, No. 1, pp. 53-54.

Comm. Fish. Abstr., Vol. 4, No. 6, p. 9.

- 1952a. Atomic fish magnet.
World Fishing (London), Vol. 1, No. 2, p. 51.

- 1952b. Behavior [of sardines] in an electrical field.
Calif. Dept. of Fish and Game, Marine Res. Comm., Calif.
Coop. Sardine Res. Program, Prog. Rept.: 1 Jan. 1951 to
30 June 1952, pp. 22-23. *

- 1952c. Electric fishing.
Pop. Mech., Vol. 97, No. 2 (Feb. 1952), p. 96.

- 1952d. Electric harpoon new development.
Fisheries Newsletter (Australia), Vol. 11, No. 2, p. 23.

- 1952e. Electric tuna fishing.
Atlan. Fisherm., Vol. 33, No. 9 (Oct. 1952), p. 9.

Text reprinted under same title in: Comm. Fish. Abstr.,
Vol. 6, No. 1, p. 1; see also FAO World Fish Abstr., July-
Aug. 1953.

- 1952f. Electric tuna fishing successful.
U. S. Dept. Int., Fish and Wildl. Serv., Comm. Fish. Rev.,
Vol. 14, No. 10, p. 75.

FAO World Fish. Abstr., July-Aug. 1953.

- 1952g. Electrical fish guiding tests reach 2nd phase.
Pacif. Fisherm., Vol. 50, No. 11 (Oct. 1952), p. 55.

Reprinted under subtitle "Guiding salmon" in: Fisheries
Newsletter (Australia), Vol. 12, No. 5, p. 15. 1952.

Anonymous (continued)

- 1952h. Electrical tuna fishing.
National Canner's Assoc., Fishery Information Bull.,
Sept. 19, 1952, pp. 217-218.
- 1952i. Electro-fishing opens to commercial fisheries.
Canadian Fisherm., Vol. 39, No. 3 (March 1952), p. 14.
- 1952j. First tests of German vessel equipped for electro-fishing.
U. S. Dept. Int., Fish and Wildl. Serv., Comm. Fish. Rev.,
Vol. 14, No. 6, p. 39.
- Summary of a report in: *Fiskaren, Apr. 23, 1952.
- 1952k. German electrofishing trials.
World Fishing (London), Vol. 1, No. 5, p. 165.
- Reprinted under subtitle "Herring test" in: Fisheries
Newsletter (Australia), Vol. 12, No. 5, p. 15. 1953.
- 1952L. Method for electric catching of salt-water fish.
Atlan. Fisherm., Vol. 32, No. 12 (Jan. 1952), pp. 18, 38-39.
- Comm. Fish. Abstr., Vol. 5, No. 4, p. 11.
Reprinted in Spanish under title "Método para la captura
eléctrica de los peces de agua salada" in: España Pesquera,
Vol. 3, No. 26, pp. 14-15. 1952.
- 1952m. Russia claims fishing without nets, using a pump, is possible.
Fishing Gaz., Vol. 69, No. 12, pp. 48, 47.
- Comments on article by Chernigin 1949.
- 1952n. Tests on electro-fishing.
Atlan. Fisherm., Vol. 33, No. 6 (July, 1952), p. 8.
- 1953a. Electric control of salmon and sea trout.
Salmon and Trout Mag., No. 139, pp. 189-191.

Anonymous (continued)

- 1953b. Electrical control of fish movements.
Engineering (London), Vol. 175, No. 4542 (Feb. 13, 1953),
p. 203.
- 1953c. Electrical devices for controlling the movements of
anadromous fish.
Nature, Vol. 171, No. 4353, pp. 591-592.
- 1953d. Experimenting with electrical fishing.
Atlant. Fisherm., Vol. 34, No. 3 (Apr. 1953), p. 26.
- 1953e. Export of electrical tuna-fishing units planned.
U. S. Dept. Int., Fish and Wildl. Serv., Comm. Fish. Rev.,
Vol. 15, No. 11, pp. 50-51.
- 1953f. Fisheries revolution.
Sci. News Letter, Vol. 63, No. 1, p. 6.
- 1953g. Fishing by electricity; excellent results in Hungary.
The Fishing News (Gt. Brit.), No. 2074 (Jan. 17, 1953), p. 10.

Summary of this article under title "Fresh-water electrical
fishing experiments" in: U. S. Dept. Int., Fish and Wildl.
Serv., Comm. Fish. Rev., Vol. 15, No. 3, p. 50. 1953.
- 1953h. New claims for electro-fishing.
Fisheries Newsletter (Australia), Vol. 12, No. 5, pp. 12-13,
15.

A review of series of articles, much of it by verbatim re-
printing; principle article reviewed is: Anon. 1952L.
- Applegate, Vernon C., Bernard R. Smith, and Willis L. Nielsen
1952. Use of electricity in the control of sea lampreys: Electro-
mechanical weirs and traps and electrical barriers.
U. S. Dept. Int., Fish and Wildl. Serv., Spec. Sci. Rept.:
Fisheries No. 92, 52 pp.

Arieff, Alex J.

1948. Threshold studies in electrical convulsions using a square wave stimulator.
Quart. Bull. Northwestern Univ. Med. Sch., Vol. 22, No. 1,
pp. 10-16.

Biol. Abstr. 21046, 1948.

Arnold, I. N.

- *1931. Kak ispol'zovat' ozera i prudy v kolkhozakh. Str. 88-91.
(How to utilize lakes and ponds in collective farming.
See pp. 88-91.)
SKKHG (Selkholkhhozgiz), Leningrad, 1931.

1933. K praktike primeneniia elektrolova.
(On the practice of electrofishing.)
Bull. of the Inst. of Fresh Water Fisheries (Leningrad),
Vol. 16, pp. 18-21. In Russian.

Translation on file, Branch of Fishery Biology, Fish and
Wildl. Serv.

Baker, Shirley

1928. Fish screens in irrigating ditches.
Trans. Amer. Fish. Soc., Vol. 58 (1928), pp. 80-82.

1932. Fish refuse to be shocked.
Electrical West, Vol. 68, No. 7 (June 1932), p. 577.

Letter to editor commenting on article by Anon. 1932.

Baker, Shirley, and U. B. Gilroy

1929. The investigation of methods and means of conserving fish
life by means of proper fish screens and fish ladders.
Bull., Wash. State Dept. of Fisheries and Game, No. 6 (Jan. 4,
1929), 8 pp.

1930. The investigation of methods and means of conserving fish
life by means of proper fish screens and fish ladders, for
period Dec. 1, 1928 to Dec. 31, 1929.
Bull., Wash. State Dept. of Fisheries and Game, No. 17
(Feb. 4, 1930), 18 pp.

Baker, Shirley, and U. B. Gilroy (continued)

1933. Problems of fishway construction: fish ladders, elevators, mechanical screens, and electrical fields at dams and intakes. Civil Engineering, Vol. 3, No. 12 (Dec. 1933), Vol. pp. 671-675.

1934. Problems of fishway construction in relation to migration of fish.

Proc. 5th Pac. Sci. Cong., Div. of Biol. Sci., Vol. 5 (1933), pp. 3609-3615.

Biol. Abstr. 20044, 1936.

Baud, Ch., and A. Fleisch

1947. Action biologique de différentes formes et fréquences de courants alternatifs.

Helvetica Physiol. et Pharmacol. Acta, Vol. 5, No. 1, pp. C8-C9.

Biol. Abstr. 6146, 1948.

Bentz, Ted

1953. Electric shocking of lampreys proves effective.

Atlan. Fisherm., Vol. 34, No. 8 (Sept. 1953), pp. 16-17.

Bernstein, Julius

1912. Elektrobiologie. Die Lehre von den elektrischen Vorgängen im Organismus auf moderner Grundlage dargestellt.

Friedr. Vieweg und Sohn, Braunschweig, 1912. 135 Ss.

Blasius, Eugen, and Fritz Schweizer

1893. Elektrotropismus und verwandte Erscheinungen.

Pflügers Arch. f. d. ges. Physiol., Bd. 53, Ss. 493-543.

Bolton, H. C.

1948. The variation of the complex dielectric constant with frequency.

Jour. Chem. Phys., Vol. 16, No. 5, pp. 486-489.

- Bordier, H.
1932. Expériences sur les effets biologiques de la d'Arsonvalisation à ondes courtes.
Comptes Rendus hebdom. Acad. des Sci. (Paris), Tome 194,
pp. 1191-1193.

Biol. Abstr. 2889, 1933.
- Bramsnaes, Frode, Mogens Jul, and C. V. Otterstrøm
1945. Barriers against fish by means of electricity or veils of air.
Rept. Danish Biol. Sta., Vol. 47 (1942), pp. 39-46.

Biol. Abstr. 24108, 1947.
- Brand, D. J., and D. Hey
1951. The electrical fish catcher as an instrument for fisheries research.
Union of So. Africa, Prov. Admin. of the Cape of Good Hope,
Inland Fisheries Dept., Rept. No. 8, pp. 6-7.
- Breuer, Josef
1905a. Über den Galvanotropismus (Galvanotaxis) bei Fischen.
Sitzungsberichte d. Kaiserlichen Akad. d. Wissensch. (Wien),
Mathemat.-Naturwiss. Klasse, Bd. 114, Abt. III, Heft 2,
Ss. 27-56.

1905b. Über den Galvanotropismus (Galvanotaxis) der Fische.
Anzeiger d. Kaiserlichen Akad. d. Wissensch. (Wien),
Mathemat.-Naturwiss. Klasse, Jahrg. 42, S. 81.
- Brown, Frank A., Jr.
1945. (A review in English of) Elektrophysiologie,
Vol. I: Allgemeine Elektrophysiologie. Vol. II: Spezielle
Elektrophysiologie, by Hans Schaefer.
Physiol. Zool., Vol. 18, No. 4, pp. 433-435.
- Brown, Orville H.
1903. The immunity of Fundulus eggs and embryos to electrical stimulation.
Amer. Jour. Physiol., Vol. 9, No. 3, pp. 111-115.

Brünings, W.

1903a. Beiträge zur Elektrophysiologie. I. Mittheilung.
Vorbemerkungen. - Ueber den Ruhestrom des Froschmuskels. I.
Pflügers Arch. f. d. ges. Physiol., Bd. 98, Ss. 241-283.

1903b. Beiträge zur Elektrophysiologie. II. Mittheilung.
Ueber Ruhestrom und Reizung.
Pflügers Arch. f. d. ges. Physiol., Bd. 100, Ss. 367-427.

Bull, H. O.

1928. Studies on conditioned responses in fishes. Part I.
Jour. Mar. Biol. Assoc. of the U. K., N. S., Vol. 15,
No. 2, pp. 485-533.

Burge, E. L.

1939. Demonstration of electrical polarity in the fish and in the
human.
Amer. Jour. Physiol., Vol. 126, No. 3, (Proceedings) pp. P450-
P451.

Burge, E. L., and W. E. Burge

1939. Effect of exercise and rest on polarity.
Amer. Jour. Physiol., Vol. 126, No. 3, (Proceedings) p. P450.

Burge, W. E.

1939. Further study on the electrical theory of anesthesia.
Amer. Jour. Physiol., Vol. 126, No. 3, (Proceedings) p. P451.

Burnet, A. M. R.

1952. Studies on the ecology of the New Zealand freshwater eels.
I. The design and use of an electric fishing machine.
Australian Jour. Mar. and Freshwater Res., Vol. 3, No. 2,
pp. 111-125.

Review of this article under title "Electricity captures
eels for life studies" in: Sci. News Letter, Vol. 63, No. 7,
p. 105. 1953.; see also Biol. Abstr. 21389, 1953.

1953. Fishing by electricity.

Canadian Fisherm., Vol. 40, No. 8 (Aug. 1953), p. 21.

- Burr, J. G.
1931. Electricity as a means of garfish and carp control.
Trans. Amer. Fish. Soc., Vol. 61 (1931), pp. 174-182.
- Canella, M. F.
1937. Si può parlare di galvanotropismo negli Ictiopsidi?
Boll. della Società italiana di biologia sperimentale (Naples),
Vol. 12, No. 10, pp. 680-682.
- Case, J. O.
1938. An answer to fish screening.
Electrical West, Vol. 80, No. 4 (Apr. 1938), pp. 32-33.
- Chanot, V.
1950. La pêche électrique.
La Pêche maritime, 30th Yr., No. 869 (Aug. 1950), pp. 347-348.
- Chernigin, M. F.
1949. Elektricheskii nevod.
(Electrical fishing net.)
Tekhnika Molodezhi (Moscow), Vol. 17, No. 10, pp. 15-18. In
Russian.

Translation on file, Branch of Fishery Biology, Fish and Wildl.
Serv.; see also Anon. 1950a and Anon. 1952m.
- Chuman, Michio
1952. Studies on the practicality of new fisheries by low frequency
electric-shocks. IV. About the circumstances of paralysis
of fish by electric-shocks.
Mem. of the Faculty of Fisheries, Kagoshima Univ. (Kagoshima,
Japan), Vol. 2, No. 1, pp. 45-48. In Japanese with English
summary.
- Clarke, Robert
1952. Electric whaling.
Nature, Vol. 169, No. 4308, pp. 859-860.
- Cobb, John N.
1922. Protecting migrating Pacific salmon.
Trans. Amer. Fish. Soc., Vol. 52 (1922), pp. 146-156.

- Coehn, Alfred, and Wakelin Barratt
 1905. Ueber Galvanotaxis vom Standpunkte der physikalischen Chemie.
 Zeitschr. f. allg. Physiol., Bd. 5, Ss. 1-9.
- Collins, G. B., Charles D. Volz, and Robert H. Lander
 1953. Mortality of salmon fingerlings exposed to pulsating direct current.
 U. S. Dept. Int., Fish and Wildl. Serv., Fish. Bull.
 (MS submitted.)
- Coppée, Georges
 1939. Un contacteur rotatif électromagnétique pour l'électro-physiologiste.
 Arch. Internat. de Physiol., Vol. 48, No. 1, pp. 127-128.
- Coppée, Georges, and Georges Gueben
 1934. Trois générateurs de courants alternatifs de fréquence variable pour les recherches physiologiques.
 Arch. Internat. de Physiol., Vol. 38, Nos. 2 and 3, pp. 239-250.
 Biol. Abstr. 18608, 1935.
- Delov, V. E., and I. F. Tomashevskii
 1933. Problema elektricheskogo lova ryby.
 (Problem of electrofishing.)
 Bull. of the Inst. of Fresh Water Fisheries (Leningrad), Vol. 16, pp. 5-17. In Russian.
 Translation on file, Branch of Fishery Biology, Fish and Wildl. Serv.
- Dénier, André
 1936. L'électro-narcose.
 Anesthésie et Analgésie, Tome 4, No. 4, pp. 451-465.
 Biol. Abstr. 14466, 1939.
- Denzer, W.
 1949. Experiences with electric fishing in inland waters.
 U. S. Dept. Int., Fish and Wildl. Serv., Fishery Leaflet No. 348, pp. 8-10.

Denzer, W. (continued)

1950. Probleme der Elektrofischerei.

Arch. f. Fischereiwiss., Jahrg. 2, Hefte 1 u. 2, Ss. 73-74.

Dittler, R.

1928. Messende Versuche zur Theorie der elektrischen Reizung.

I. Allgemeine Problemstellung. Der Reizapparat.

Zeitschr. f. Biol., Bd. 87 (N. F. Bd. 69), Heft 6, Ss. 543-556.

Dittler, R., and H. K. Müller

1928. Messende Versuche zur Theorie der elektrischen Reizung.

II. Der Störungswert der Strompause in Abhängigkeit von ihrer Lage im Stromstoss, gemessen durch "Kompensierung nach unten."

Zeitschr. f. Biol., Bd. 87 (N. F. Bd. 69), Heft 6, Ss. 557-572.

Elson, Paul F.

1949. Techniques for studying stream populations.

Fish. Res. Bd. Can., Annual Rept. Atl. Biol. Sta., 1948, App. 71, pp. 87-89, mimeo.

1950. Usefulness of electrofishing methods.

Can. Fish Cult., No. 9 (Dec. 1950), pp. 3-12.

Embody, Daniel R.

1940. A method of estimating the number of fish in a given section of a stream.

Trans. Amer. Fish. Soc., Vol. 69 (1939), pp. 231-236.

Engelen, (?)

1912. Die elektrische Narkose bei Fischen.

Deutsche Medizinische Wochenschr., Jahrg. 38, II Halbjahr, Nr. 33, S. 1558.

Ewald, J. Rich.

1894. Ueber die Wirkung des galvanischen Stroms bei der Längsdurchströmung ganzer Wirbelthiere.

Pflügers Arch. f. d. ges. Physiol., Bd. 55, Ss. 606-621.

Fessard, A., and H. Laugier

1932. Appareil en vue de la réalisation d'excitations sélectives par la durée.
Comptes Rendus hebdom. Soc. de Biol. (Paris), Tome 110,
pp. 1232-1235.

Biol. Abstr. 8045, 1934.

Fick, (?)

1951. Der Thunfisch mit der elektrischen Angel.
Hansa, Jahrg. 88, Hefte 46 u. 47 (Nov. 17, 1951), S. 1723.

Fisher, Kenneth C.

1950. Physiological considerations involved in electrical methods of fishing.
Can. Fish Cult., No. 9 (Dec. 1950), pp. 26-33.

Fisher, Kenneth C., and Paul F. Elson

1950. The selected temperature of Atlantic salmon and speckled trout and the effect of temperature on the response to an electrical stimulus.
Physiol. Zool., Vol. 23, No. 1, pp. 27-34.

Frenkel, I. I., and G. P. Vager

1948. Deystvie elektricheskogo polia na struiu zhidkosti.
(Effect of an electric field upon a stream of liquid.)
Izvestiia Akademii nauk SSSR, Seriiã geograficheskaiã i geofizicheskaiã (Bull. Acad. Sci. U. S. S. R., Geog. and Geophys. Series), Tom 12, No. 1, pp. 3-6. In Russian.

*Fritzsche, H.

1927. Fang mittels Elektrizität.
Mitteil. d. Fischerei-Verein f. d. Prov. Brandenburg usw.,
Bd. 31 (N. F. Bd. 19), Ss. 352- ? .

Fujita, Masakatsu

1906. Kanden denki no gyorui ni oyobosu hanō jikken.
(Experiments on the reaction of fishes towards induction currents of electricity).
Zool. Mag. (Tokyo), Vol. 18, pp. 153-155. In Japanese.

Funk, John L.

1949. Wider application of the electrical method of collecting fish.
Trans. Amer. Fish. Soc., Vol. 77 (1947), pp. 49-60.

Gallois, M., and M. de Drouin de Bouville

- 1933a. Grilles tournantes et grilles électriques aux États-Unis en 1931.
Bull. Français de Piscicult., 6th Yr., No. 63, pp. 63-69.

- 1933b. L'action de l'électricité sur le poisson et la technique des grilles électrique; d'après les travaux du Docteur Holzer.
Bull. Français de Piscicult., 5th Yr., No. 56, pp. 254-260.

Gerard, R. W.

1942. Electrophysiology.
Ann. Rev. Physiol., Vol. 4, pp. 329-358.

Gilroy, U. B.

1931. Alfalfa, kilowatts, and fish.
Outdoor America, Vol. 9, No. 10, pp. 14-15, 27.

Gradinesco, Ar. [E.], and A. Eugen [E.] Pora

1935. Influence du courant électrique continu sur la perméabilité branchiale, chez quelques poissons d'eau douce.
Bull. Soc. Chimie Biologique, Tome 17, No. 6, pp. 1054-1057.

Biol. Abstr. 2923, 1936.

1937. L'influence du courant électrique continu sur la résistance des poissons d'eau douce aux salinités.
Buletinul Societății de Științe din Cluj [Bull. de la Soc. des Sci. de Cluj (Cluj, Rumania)], Vol. 8, No. 4, pp. 615-617.

*Gregora, O.

1951. (Electrical guards against fish.)
Elektrotechnicky Obzor (Prague), Vol. 40, Nos. 11 to 14, pp. ? .
In Bohemian?

Translation on file, Pacific Salmon Invest., Fish and Wildl. Serv.

Groody, Tom, Anatole Loukashkin, and Norman Grant

1952. A preliminary report on the behavior of the Pacific sardine (Sardinops caerulea) in an electrical field.
Proc. Cal. Acad. Sci., 4th Ser., Vol. 27, No. 8, pp. 311-323.

FAO World Fish. Abstr., July-Aug. 1953.

*Hager, Franz

1934. Die Elektrizität im Dienste der Wildbachfischerei.
Österreich Fischereiwirtschaft, Nrs. 7 u. 8 (July-Aug. 1934),
Ss. 1-3.

Citation based on review by David S. Shetter in: U. S. Dept.
Int., Fish and Wildl. Serv., Prog. Fish-Cult., No. 36 (Feb.-
Mar. 1938), pp. 32-33.

Hammond-Davies, B. E.

1952. "Pirate" fish get a shock; being some recent experiences
in electric fishing.
Salmon and Trout Mag., No. 135, pp. 124-140.

Harrer, R.

- 1926a. Elektrischer Fischfang.
Fischerei-Zeitung, Bd. 29, Nr. 23, S. 507.

- 1926b. Elektrisches Fischen.

Allg. Fischerei-Zeitung, Jahrg. 51, Nr. 13, Ss. 210-211.

Harreveld, A. van

1937. Electronarcosis with alternating current in fish.
Arch. Néerlandaises de Physiol., Vol. 22, No. 1, pp. 84-92.

1938. On galvanotropism and oscillotaxis in fish.
Jour. Exp. Biol., Vol. 15, No. 2, pp. 197-208.

1947. On the mechanism and localization of the symptoms of electro-
shock and electronarcosis.
Jour. Neuropath. and Exptl. Neurol., Vol. 6, No. 2, pp. 177-
184.

Biol. Abstr. 6498, 1948.

- Harreveld, A. van, M. S. Plesset, and C. A. G. Wiersma
1942. The relation between the physical properties of electric currents and their electronarcotic action.
Amer. Jour. Physiol., Vol. 137, No. 1, pp. 39-46.

Biol. Abstr. 8650, 1943.
- Harreveld, A. van, D. B. Tyler, and C. A. G. Wiersma
1943. Brain metabolism during electronarcosis.
Amer. Jour. Physiol., Vol. 139, No. 2, pp. 171-177.
- Harris, Virgil E.
1953. Some practical aspects of electric fishing.
Atlan. Fisherm., Vol. 34, No. 1 (Feb. 1953), pp. 13, 34.

FAO World Fish. Abstr., Sept.-Oct. 1953.
- Hashimoto, Tsuruo
1953. An experiment on the performance of an electric fish screen.
Bull. of the Jap. Soc. of Sci. Fish., Vol. 19, No. 1,
pp. 23-30. In Japanese with English summary.
- Haskell, David C.
1940a. An electrical method of collecting fish.
Trans. Amer. Fish. Soc., Vol. 69 (1939), pp. 210-215.

1940b. Electric shock provides method of anesthetizing fish in laboratory.
U. S. Dept. Int., Fish and Wildl. Serv., Prog. Fish-Cult.,
No. 49 (Mar.-Apr. 1940), pp. 33-34.
- Haskell, David C., and Robert G. Zilliox
1941. Further developments of the electrical method of collecting fish.
Trans. Amer. Fish. Soc., Vol. 70 (1940), pp. 404-409.
- Hatai, Shinkishi, Seiji Kokubo, and Noboru Abe
1932. The earth currents in relation to the responses of catfish.
Proc. of the Imperial Acad. of Japan (Tokyo), Vol. 8, No. 10,
pp. 478-481.

Biol. Abstr. 21044, 1933.

Hauck, Forrest R.

1949. Some harmful effects of the electric shocker on large rainbow trout.
Trans. Amer. Fish. Soc., Vol. 77 (1947), pp. 61-64.

Hermann, L.

1885. Eine Wirkung galvanischer Ströme auf Organismen.
Pflügers Arch. f. d. ges. Physiol., Bd. 37, Ss. 457-460.
1886. Weitere Untersuchungen über das Verhalten der Froschlarven im galvanischen Strom.
- Pflügers Arch. f. d. ges. Physiol., Bd. 39, Ss. 414-419.

Hermann, L., and Fr. Matthias

1894. Der Galvanotropismus der Larven von Rana temporaria und der Fische.
Pflügers Arch. f. d. ges. Physiol., Bd. 57, Ss. 391-405.

Higgins, Elmer

1930. Progress in biological inquiries, 1928.
App. 10 to Rept. of (U. S.) Commissioner of Fisheries for the Fiscal Year 1929, p. 650.
- 1931a. Progress in biological inquiries, 1929.
App. 15 to Rept. of (U. S.) Commissioner of Fisheries for the Fiscal Year 1930, pp. 1097-1101.
- 1931b. Progress in biological inquiries, 1930.
App. 3 to Rept. of (U. S.) Commissioner of Fisheries for the Fiscal Year 1931, pp. 595-601.
1932. Progress in biological inquiries, 1931.
App. 3 to Rept. of (U. S.) Commissioner of Fisheries for the Fiscal Year 1932, pp. 484-489.
1933. Progress in biological inquiries, 1932.
App. 2 to Rept. of (U. S.) Commissioner of Fisheries for the Fiscal Year 1933, pp. 111-113.

*Hiyama, Yoshio, and Takaya Kusaka

1950. Effect of electric current on fish, regarding direction, intensity, frequency and type of current.
Studies of Aquatic Animals of Japan, Vol. 1, pp. 1-10.

Hoagland, Hudson

- 1933a. Electrical responses from the lateral-line nerves of catfish. I.
Jour. Gen. Physiol., Vol. 16, No. 4, pp. 695-714.
- 1933b. Electrical responses from the lateral-line nerves of fishes. III.
Jour. Gen. Physiol., Vol. 17, No. 1, pp. 77-82.
- 1933c. Quantitative analysis of responses from lateral-line nerves of fishes. II.
Jour. Gen. Physiol., Vol. 16, No. 4, pp. 715-732.

Holmes, Harlan B.

1948. History, development, and problems of electric fish screen.
U. S. Dept. Int., Fish and Wildl. Serv., Spec. Sci. Rept.
No. 53, 62 pp.

Holzer, Wolfgang

- 1931a. Der elektrische Fischrechen.
Mitteil. a. d. Inst. f. Wasserbau d. Techn. Hochschule Berlin
(Berlin), Nr. 8 (1931), 3 Ss.
- Also in: *Wasserkraft u. Wasserwirtschaft, Jahrg. 1931,
Heft 17, Ss. 203- ? .
- 1931b. Fischfang mit Elektrizität.
Elektrotechnische Zeitschr., Jahrg. 52, Heft 47 (Nov. 19,
1931), Ss. 1442-1444.
- 1931c. Über eine absolute Reizspannung bei Fischen.
Pflügers Arch. f. d. ges. Physiol., Bd. 229, Ss. 153-172.
Biol. Abstr. 21705, 1932.

Holzer, Wolfgang (continued)

1932a. Bemerkungen zur Anwendung der Elektrizität in der Fischereiwirtschaft.

Allg. Fischerei-Zeitung, Jahrg. 57, Nr. 14, Ss. 218-220.

1932b. Bemerkungen zur Anwendung der Elektrizität in der Fischereiwirtschaft.

Fischerei-Zeitung, Bd. 35, Nr. 35, Ss. 413-414.

Text differs from that of preceeding citation having same title.

1932c. Der elektrische Fischrechen. Ein Beitrag zur Wirtschaftlichkeit von Wasserkraft-Niederdruckwerken.

Mitteil. a. d. Inst. f. Wasserbau d. Techn. Hochschule Berlin, Nr. 12 (1932), 35 Ss.

*1933a. Fischfang mit elektrischem Strom in Hamm.

Mitteil. d. Fischerei-Verein Westausgabe, Bd. 3, Ss. 260- ? .

1933b. Modelltheorie über die Stromdichte im Körper von Lebewesen bei galvanischer Durchströmung in Flüssigkeit.

Pflügers Arch. f. d. ges. Physiol., Bd. 232, Ss. 821-834.

1933c. Über die Stromdichte im Forellenei bei galvanischer Durchströmung in Flüssigkeit.

Pflügers Arch. f. d. ges. Physiol., Bd. 232, Ss. 835-841.

Houston, Robert B., Jr.

1949. German commercial electrical fishing device.

U. S. Dept. Int., Fish and Wildl. Serv., Fishery Leaflet No. 348, pp. 1-4.

Howells, Thomas H.

1931. An electrical stimulus-apparatus.

Amer. Jour. Psych., Vol. 43, pp. 122-123.

Hyman, L. H., and A. W. Bellamy

1922. Studies on the correlation between metabolic gradients, electrical gradients and galvanotaxis. I.

Biol. Bull., Vol. 43, No. 5, pp. 313-347.

Iwata, K. S.

1950. Spawning of Mytilus edulis. (2). Discharge by electrical stimulation.
Bull. of the Jap. Soc. of Sci. Fish., Vol. 15, No. 9, pp. 443-446. In Japanese with English summary.

Biol. Abstr. 23719, 1952.

Jaisle, Karl

1934. Über den Ertrag des Forellenbaches.
Allg. Fischerei-Zeitung, Jahrg. 59, Nr. 2, Ss. 18-20.

Jellinek, Stefan

1909. Atlas der Elektropathologie.
Urban und Schwarzenberg, Berlin, 1909. xi + 92 Ss.

Joeris, Leonard

1949. Electric seine used in Kentucky.
U. S. Dept. Int., Fish and Wildl. Serv., Prog. Fish-Cult.,
Vol. 11, No. 2, pp. 119-121.

Johnson, Charles F., Jr.

1950. Quality of liquids measured electrically.
Electrical Manufacturing, Vol. 46, No. 2 (Aug. 1950),
pp. 112-113.

Kerr, James E.

1953. Studies on fish preservation at the Contra Costa steam plant of the Pacific Gas and Electric Company.
Calif. Dept. of Fish and Game, Fish. Bull. No. 92, 66 pp.
(Investigation of electric fish screens, pp. 41-42.)

King, Barry G.

1934. The effect of electric shock on heart action with special reference to varying susceptibility in different parts of the cardiac cycle.
Aberdeen Press, New York, 1934. 20 pp.

Koch, H.

1932. Eine Röhrenanordnung zur Erzeugung pulsierender Gleichströme variabler Frequenz, Intensität und variablen Unterbrechungsverhältnisses.
Pflügers Arch. f. d. ges. Physiol., Bd. 231, Ss. 169-174.

Kokubo, Seiji

1934. On the behaviour of catfish in response to galvanic stimuli.
The Sci. Repts. of the Tōhoku Imperial Univ. (Sendai, Japan),
Fourth Series (Biology), Vol. 9, Nos. 2 and 3, pp. 87-96.

Biol. Abstr. 13193, 1936.

Kokubo, Seiji, Noboru Abe, and Kiyoshi Uzuka

1933. Response of fishes to the change of environmental factors.
I. Relation of earth current and electrical stimulus to
the behaviour of fishes.
Saito ho-on kai (The Saito Gratitude Foundation, Sendai, Japan),
Ann. Rept. of the Work, No. 9 (1932), pp. 33-37.

Köllensperger, F. K., and F. Scheminzky

1938. Der "galvanische Krampf" bei aufsteigender Durchströmung von
Fröschen.
Pflügers Arch. f. d. ges. Physiol., Bd. 241, Ss. 38-53.
[Note: Publisher's date for entire Bd. 241 is 1939.]

Kraus, Herbert, and Walter Reiffenstuhl

1933. Vergleich von Galvanonarkose und "Wechselstromnarkose" bei
Fischen und Fröschen.
Pflügers Arch. f. d. ges. Physiol., Bd. 233, Ss. 380-385.

Kreutzer, Conradin

1950. Die physiologischen Grundlagen der Elektrofischerei im Meer.
Arch. f. Fischereiwiss., Jahrg. 2, Hefte 1 u. 2, Ss. 10-14.

1951. Thune werden elektrisch geangelt.
Fischereiwelt, Jahrg. 3, Heft 10, Ss. 160-161.

FAO World Fish. Abstr., May-June 1952.

Kreutzer, Conradin, and Herbert Peglow

1949. The application of electro-physiological effects on fishing.
Fishing Gaz., Vol. 66, No. 12 (Dec. 1949), pp. 52, 79.

Comm. Fish. Abstr., Vol. 3, No. 5, p. 3.; see also FAO
World Fish. Abstr., July-Aug. 1950.

Kuroki, Toshirō

- * ? Study of electrified fishing nets [Reports 1 and 2].
Jour. of Imperial Fish. Inst. (Tokyo), Vol. 16, Nos. 4 and 11.

1950. Study on the electric fishing-screen. I. On the selection of effective frequencies.

Bull. of the Jap. Soc. of Sci. Fish., Vol. 16, No. 4,
pp. 165-170. In Japanese with English summary.

Biol. Abstr. 23721, 1952.

1951. Studies on the electric fish-screen. II. On the effects of stimuli by A. C., F. R. C., and H. R. C.

Bull. of the Jap. Soc. of Sci. Fish., Vol. 17, No. 5,
pp. 128-131. In Japanese with English summary.

1952. Study on the electric fish-screen. IV. The electrifying effects by 10^{-4} sec. order low frequency electric shocks upon fish bodies.

Bull. of the Jap. Soc. of Sci. Fish., Vol. 18, No. 1,
pp. 25-29. In Japanese with English summary.

FAO World Fish. Abstr., Mar.-Apr. 1953.; see also Biol. Abstr. 5679, 1953.

1953a. Studies on the electric fish-screen. VIII. About the interruption of the electrifying in trawl-net fishing.

Bull. of the Jap. Soc. of Sci. Fish., Vol. 18, No. 9,
pp. 385-388. In Japanese with English summary.

Biol. Abstr. 29206, 1953.

1953b. Study on the electric fishing-net. IX. About the relations between electric-power and electrocution.

Bull. of the Jap. Soc. of Sci. Fish., Vol. 18, No. 12,
pp. 698-702. In Japanese with English summary.

Kuroki, Toshirō, and Michio Chuman

1950. Study on the practicality of new fisheries by low frequency electric-shocks. I. About the electric resistance in fish bodies.

Jour. of the Kagoshima Fisheries Coll. (Kagoshima, Japan),
Vol. 1 (Dec. 1950), pp. 15-21. In Japanese with English summary.

Kuroki, Toshirō, and Michio Chuman (continued)

1952. Study on the electric fishing-net. VI. About the electric-power on the fish-body in the water.
Mem. of the Faculty of Fisheries, Kagoshima Univ. (Kagoshima, Japan), Vol. 2, No. 1, pp. 41-44. In Japanese with English summary.

1953. Studies on the electric-fish screen. VII. About the practical arrangements of electrodes to give proper distribution of potential.
Bull. of the Jap. Soc. of Sci. Fish., Vol. 18, No. 9, pp. 381-384. In Japanese with English summary.

Biol. Abstr. 29205, 1953.

Kuroki, Toshirō, Yasuo Kato, and Kazuaki Nagashima

1952. Study on the electric fish-screen. III. The applicability to shell-fish culture.
Bull. of the Jap. Soc. of Sci. Fish., Vol. 18, No. 1, pp. 21-24. In Japanese with English summary.

FAO World Fish. Abstr., Mar.-Apr. 1953.; see also Biol. Abstr. 5680, 1953.

Kuroki, Toshirō, and Tomokazu Morita

1950. Study on the practicality of new fisheries by low frequency electric-shocks. II. About the electrocuting test on the shark in the long-line fishing.
Jour. of the Kagoshima Fisheries Coll. (Kagoshima, Japan), Vol. 1 (Dec. 1950), pp. 22-27. In Japanese with English summary.

Kuroki, Toshirō, Tomokazu Morita, and Tatsuro Fukudome

1953. Studies on the practicality of new fisheries by low frequency electric-shocks. III. About the electrocuting test on the sharks in the long-line fishing.
Bull. of the Jap. Soc. of Sci. Fish., Vol. 18, No. 8, pp. 359-361. In Japanese with English summary.

Biol. Abstr. 29208, 1953.

Larimore, R. Weldon, Leonard Durham, and George W. Bennett

1950. A modification of the electric fish shocker for lake work.
Jour. Wildl. Mgmt., Vol. 14, No. 3, pp. 320-323.

Larkin, P. A.

1950. Canadian uses of electrical fish shocking devices.
Can. Fish Cult., No. 9 (Dec. 1950), pp. 21-25.

Larsen, Knud

1949. First report on the effect of the liberation of salmon fry
in the Gudena 1946-47.
Rept. Danish Biol. Sta., Vol. 49 (1946), pp. 27-37.

Ledward, T. A.

1951. A water conductivity tester.
Electrician, Vol. 147, No. 19 (Nov. 9, 1951), p. 1455.

Leitritz, Earl

1952. Stopping them: The development of fish screens in
California.
Calif. Fish and Game, Vol. 38, No. 1, pp. 53-62.

Lethlean, N. G.

1953. An investigation into the design and performance of electric
fish-screens and an electric fish-counter.
Trans. Roy. Soc. Edinburgh, Vol. 62, Part 2, No. 13, pp. 479-
526.

Linke, R.

- *1926. Erfahrungen bei der fischereilichen Bewirtschaftung der
Weisseritzalsperren.
Grünes Korresp.-Bl. f. Fischzüchter usw. (Dresden), Jahrg. 31,
Ss. 204- ? .

1927. Fischen mit Elektrizität.

Landwirtschaftliche Wochenschr. f. d. Prov. Sachsen, 1927,
Heft 1, Ss. 5-6.

Loeb, Jacques

1918. Forced movements, tropisms, and animal conduct.
Lippincott Co., Phila. and London, 1918. 209 pp.

Lucas, Keith

1906. On the optimal electric stimuli of muscle and nerve.
Jour. Physiol., Vol. 35, Nos. 1 and 2, pp. 103-114.

Lucas, Keith (continued)

1907. On the rate of variation of the exciting current as a factor in electric excitation.
Jour. Physiol., Vol. 36, Nos. 4 and 5, pp. 253-274.

Ludloff, Karl

1895. Untersuchungen über den Galvanotropismus.
Pflügers Arch. f. d. ges. Physiol., Bd. 59, Ss. 525-554.

*(Margreiter)

1932. Fischfang mit elektrischem Strom.
Der Tiroler u. Vorarlberger Fischer, Bd. 7, S. 85.

Karlier, G., and J. Michel

1951. La pêche électrique.
Ann. de la Soc. Roy. Zool. de Belgique, Tome 81 (1950),
pp. 147-150.

Marsden, Robert

- 1952a. Electrical method of killing whales.
World Fishing (London), [Part 1] Vol. 1, No. 3, pp. 97-100;
[Part 2] Vol. 1, No. 4, pp. 127-133.

FAO World Fish. Abstr., Sept.-Oct. 1953.

*1952b. Electrocutation of whales.

General Electric Co. Jour. (London), Vol. 19, No. 2,
pp. 122-123.

FAO World Fish. Abstr., Sept.-Oct. 1953.

Marton, L. L.

1950. Exploration of electrostatic and magnetic fields.
Sci. Monthly, Vol. 71, No. 7 (July 1950), pp. 3-10.

McCombs, Rollin K., and Frank C. Walz

1945. An improved electronic stimulator.
Rev. Sci. Instruments, Vol. 16, No. 9, pp. 249-252.

Biol. Abstr. 8021, 1946.

McKinley, G. Murray

1930. Some biological effects of high frequency electrostatic fields.

Proc. Penn. Acad. Sci., Vol. 4, pp. 43-46.

1933. The ultrahigh frequency magnetic-electric field in biology. Univ. Pittsburgh Bull., Vol. 30, No. 2, pp. 183-188.

Biol. Abstr. 13576, 1935.

McKinley, G. Murray, and John G. McKinley, Jr.

1931. The vacuum tube oscillator in biology.

Quart. Rev. Biol., Vol. 6, No. 3, pp. 322-328.

Biol. Abstr. 12902, 1932.

McKinley, John G. Jr., and G. Murray McKinley

1930. High frequency equipment for biological experimentation.

Science, Vol. 71, No. 1846, pp. 508-510.

Biol. Abstr. 10771, 1931.

McLain, Alberton L., and Willis L. Nielsen

1952. Directing the movement of fish with electricity.

U. S. Dept. Int., Fish and Wildl. Serv., Spec. Sci. Rept.: Fisheries No. 93, 24 pp.

McMillan, F. O.

1928. Electric fish screen.

Bull., U. S. Bureau of Fisheries, Vol. 44, pp. 97-128.

Biol. Abstr. 3935, 1930.

Meyer, P[aul] F[riedrich]

1951. Erfahrungen mit der elektrischen Thunfischangel.

Fischereiwelt, Jahrg. 3, Heft 11, Ss. 176-178.

Meyer, P[aul] F[riedrich] (continued)

1952. Der Weg zum Elektrotrawl ist frei.

Fischereiwelt, Jahrg. 4, Heft 5, Ss. 73-74.

FAO World Fish. Abstr., Jan.-Feb. 1953.

Also in: *Die Fisch Industrie (Bremerhaven), Vol. 4, No. 5;
and, appears in summary form in: *Het Visserijblad (Ostend),
Vol. 7, No. 22 (May 30, 1952), p. V; Vol. 7, No. 23 (June 6,
1952), p. VIII.

*Mohnke, (?)

1932. Elektrischer Fischfang in Hamm.

Mitteil. d. Fischerei-Verein Westausgabe, Bd. 2, Ss. 210- ? .

Morgan, Morris E.

1951a. Fishing with electricity.

Univ. of Hawaii, Hawaii Marine Lab., News Circular No. 12
(Mar. 30, 1951), 3 pp., mimeo.

FAO World Fish. Abstr., May-June 1952.

1951b. The response of a tropical fish to interrupted direct current
and its application to the problems of electrofishing in sea-
water.

M.S. Thesis, Univ. of Hawaii, June 1951, 68 pp.

1953. The response of a tropical fish to direct current and its
application to the problems of electrofishing in sea water.
Pacific Science, Vol. 7, No. 4, pp. 482-492.

Morris, Robert W.

1950. An application of electricity to collection of fish.

U. S. Dept. Int., Fish and Wildl. Serv., Prog. Fish-Cult.,
Vol. 12, No. 1, pp. 39-42.

Myers, Gerald F.

1951. The design of an electric shocker boat.

U. S. Dept. Int., Fish and Wildl. Serv., Prog. Fish-Cult.,
Vol. 13, No. 4, pp. 229-231.

Nagel, Wilibald A.

1895. Ueber Galvanotaxis.

Pflügers Arch. f. d. ges. Physiol., Bd. 59, Ss. 603-642.

Neb, K. -E.

1952. Betäubung von Fischen durch elektrische Ströme.

Fischereiwelt, Jahrg. 4, Heft 3, Ss. 44-45.

Neergaard, K. v.

1922. Experimentelle Untersuchungen zur Elektronarkose.

Arch. f. Klinische Chirurgie, Bd. 122, Ss. 100-150.

Nicolai, Ludwig

1930. Über Elektrotaxis und Elektronarkose von Fischen.

Pflügers Arch. f. d. ges. Physiol., Bd. 224, Ss. 268-277.

Biol. Abstr. 10016, 1932.

Nomura, Shichiroku, and Kiyoo Ishikawa

1933. Response of fishes to the change of environmental factors.

II. Preliminary experiments in the measurement of chronaxie in fishes.

Saito ho-on kai (The Saito Gratitude Foundation, Sendai, Japan),
Ann. Rept. of the Work, No. 9 (1932), pp. 37-42.

"Observer"

1928. Electrical screen tested.

Western Out-of-Doors, Vol. 5, No. 7 (Sept. 1928), p. 11.

*Ohta, T.

1924. (Investigations on electric current and living fish.)

Suisan Kenkiushi, Vol. 19, No. 12, p. 432. In Japanese.

Okada, Mituyo

1929a. Note on leading the movement of fish-groups by electric current.

Jour. of Imperial Fish. Inst. (Tokyo), Vol. 24, No. 5,
pp. 124-128.

Biol. Abstr. 4353, 1930.

Okada, Mituyo (continued)

- 1929b. On the action of electric current on fishes. I. Excitation and narcosis.

Jour. of Imperial Fish. Inst. (Tokyo), Vol. 24, No. 2, pp. 64-72.

Biol. Abstr. 11542, 1930.

- 1929c. On the action of electric current on fishes. II. Electrophotaxis of fishes in a group.

Jour. of Imperial Fish. Inst. (Tokyo), Vol. 25, No. 1, pp. 1-11.

Biol. Abstr. 1087, 1931.

Omand, D. N.

1950. Electrical methods of fish collection.

Can. Fish Cult., No. 9 (Dec. 1950), pp. 13-20.

Peglow, Herbert

1949. Use of electro-physiological effects in ocean fishing.

U. S. Dept. Int., Fish and Wildl. Serv., Fishery Leaflet No. 348, pp. 5-8.

Peterson, C. E.

1952. Electrical-fishing experiments in salt water reported successful.

U. S. Dept. Int., Fish and Wildl. Serv., Comm. Fish. Rev., Vol. 14, No. 10, pp. 62-64.

FAO World Fish. Abstr., July-Aug. 1953.

"Petræle"

1953. Salmon to be shocked into place.

Pacif. Fisherm., Vol. 51, No. 8 (July 1953), p. 35.

Pora, E. -A.

- 1936a. Influence du passage du courant continu dans le milieu extérieur, sur la composition du sang, chez Scyllium canicula, la région branchiale étant au voisinage de la cathode. Comptes Rendus hebdom. Soc. de Biol. (Paris), Tome 121, pp. 411-413.

Pora, E. -A. (continued)

- 1936b. Sur les modifications du milieu intérieur de Scyllium canicula soumis au courant continu, quand la région branchiale se trouve à la proximité de l'anode.
Comptes Rendus hebdom. Soc. de Biol. (Paris), Tome 121, pp. 503-504.

- 1936c. Sur les modifications que produit le courant électrique continu, dans le milieu intérieur du Scyllium canicula male orienté dans la direction de passage du courant pendant des temps variables.
Comptes Rendus hebdom. Soc. de Biol. (Paris), Tome 121, pp. 507-508.

Pratt, Virgil S.

1952. A measure of the efficiency of alternating and direct current fish shockers.
Trans. Amer. Fish. Soc., Vol. 81 (1951), pp. 63-68.

Prevost, Gustave

1945. Electric fishing.
Quebec Game and Fish. Dept., Gen. Rept. Minister Game and Fish. for year ending March 31, 1945, 3rd Rept. Biol. Bur., pp. 59-65.

Ramstedt, C. O.

1872. (Om den galvaniska induktionsströmmens inverkan på fiskarnes färg.)
Öfversigt af Finska Vetenskaps-Societetens Förhandlingar (Helsingfors), Vol. 14, pp. 6-7. In Swedish.

Rayner, H. J.

1949. Direct current as aid to the fishery worker.
U. S. Dept. Int., Fish and Wildl. Serv., Prog. Fish-Cult., Vol. 11, No. 3, pp. 169-170.
1950. Electrodes used in electrofishing.
U. S. Dept. Int., Fish and Wildl. Serv., Prog. Fish-Cult., Vol. 12, No. 1, pp. 42-43.

Regnart, H. C.

- 1931a. The generation of electric currents by water moving in a magnetic field.
Proc. Univ. Durham Phil. Soc., Vol. 8, Part 4, pp. 291-300.

- 1931b. The lower limits of perception of electrical currents by fish.
Jour. Mar. Biol. Assoc. of the U. K., N. S., Vol. 17, No. 2,
pp. 415-420.

Biol. Abstr. 21048, 1933.

Regnault, Jules

1930. Electro- et radio-culture.
Revue de Path. Comp. et d'Hyg. Gén. (Paris), Vol. 30,
Nos. 402 and 403, pp. 927-939.

Biol. Abstr. 13756, 1931.

Reichert, W.

1949. On electrocution of whales.
U. S. Dept. Int., Fish and Wildl. Serv., Fishery Leaflet
No. 348, pp. 14-16.

Reinmann, F. L.

1946. Electric fish screen keeps intake clear.
Electrical World, Vol. 125, No. 15 (Apr. 13, 1946), pp. 149-150.

Rhodes, Douglas Nelson

1951. He makes fish stop and go.
Sat. Eve. Post, Vol. 223, No. 41 (Apr. 7, 1951), p. 17.

Richet, Charles

1927. Des conditions de la mort par le tétanos électrique chez les poissons.
Comptes Rendus hebdom. Acad. des Sci. (Paris), Tome 184,
pp. 1100-1103.

Ritchie, Anthony E.

1944. A simple variable "square-wave" stimulator for biological work.
Jour. Sci. Instruments, Vol. 21, No. 4, pp. 64-65.

Biol. Abstr. 21022, 1944.

Röhrh, Georg

1949. Praktische Erfahrungen beim Fischfang mit Elektrizität.
Allg. Fischerei-Zeitung, Jahrg. 74, Nr. 4, Ss. 49-50.

Rshevkin, S. N., and N. N. Malov

1928. Untersuchung der Muskelreizschwelle durch Wechselstrom.
Pflügers Arch. f. d. ges. Physiol., Bd. 218, Ss. 708-715.

Biol. Abstr. 11068, 1931.

Rushton, W.

1952. Fish killed by shock.
Salmon and Trout Mag., No. 135, pp. 168-169.

Savage, P. L.

1936. Engineer holds electric screen is answer to fish conservation.
Sportsman's Review, Vol. 1, No. 4 (July 1936), p. 3.

*Schäfer, (?)

1927. Versuche mittels Elektrizität zur Abfischung nicht ablass-
barer Gewässer.
Mitteil. d. Fischerei-Verein f. d. Prov. Brandenburg usw.,
Bd. 31 (N. F. Bd. 19), Ss. 348- ? .

Scheminzky, Ferd[inand]

1922. Über die verschiedene Empfindlichkeit der Forelleneier während
ihrer Entwicklung dem elektrischen Strom gegenüber.
Biochem. Zeitschr., Bd. 132, Hefte 1-3, Ss. 154-164.

1923. Über den Einfluss dauernder elektrischer Durchströmung
auf Lebewesen. (Elektrokultur.) I. Mitteilung. Versuche
an Fischen.
Arch. f. Mikr. Anat. u. Entw.-Mech., Bd. 98, Hefte 3 u. 4,
Ss. 315-378.

- 1924a. Über das Auftreten der Galvanotaxis bei Forellenembryonen.
Zeitschr. f. Biol., Bd. 80 (N. F. Bd. 62), Hefte 1 u. 2,
Ss. 23-34.

- 1924b. Versuche über Elektrotaxis und Elektronarkose.
Pflügers Arch. f. d. ges. Physiol., Bd. 202, Ss. 200-216.

Scheminzky, Ferdinand (continued)

- 1928a. Der Fischfang mit elektrischem Strom.
Nachrichtenblatt f. Fischzucht u. Fischerei (Tetschen a.
Elbe), Bd. 1, Nr. 4, Ss. 49-53.
- 1928b. Kammergericht. Fischfang mit Elektrizität.
Allg. Fischerei-Zeitung, Jahrg. 53, Nr. 13, S. 203.
- 1931a. Die Stromdichte im Körper der Wollhandkrabbe bei galvanischer
Reizung in Süßwasser und Seewasser.
Pflügers Arch. f. d. ges. Physiol., Bd. 229, Ss. 242-250.

Biol. Abstr. 2969, 1933.
- 1931b. Über galvanotaxis bei erwachsenen Echinodermen.
Pflügers Arch. f. d. ges. Physiol., Bd. 226, Ss. 58-78.
- 1931c. Weitere Untersuchungen über die Galvanotaxis von
Echinodermen.
Pflügers Arch. f. d. ges. Physiol., Bd. 226, Ss. 354-365.
- 1931d. Zur Analyse der zweiphasischen Galvanotaxis der Echinodermen.
Pflügers Arch. f. d. ges. Physiol., Bd. 226, Ss. 366-376.
- 1933a. Über die Natur der "Wechselstromnarkose" bei Fischen.
A Magyar Biológiai Kutatóintézet Munkái (Tihany, Hungary)
(Arbeiten d. Ungarischen Biologischen Forschungsinst.),
Bd. 6, Ss. 209-211.

Biol. Abstr. 13579, 1935.
- 1933b. Über die Natur der "Wechselstromnarkose" bei Fischen.
Pflügers Arch. f. d. ges. Physiol., Bd. 233, Ss. 371-379.
- 1936a. Neuere Untersuchungen über elektrische Narkose.
Wiener Klinische Wochenschr., Jahrg. 49, Nr. 39,
Ss. 1190-1191.
- 1936b. Zur Physiologie der Galvanonarkose bei Wassertieren.
Pflügers Arch. f. d. ges. Physiol., Bd. 237, Ss. 273-283.

Scheminzky, Ferdinand (continued)

1947. Depolarisation als Ursache der α -Nachwirkungen bei Galvanonarkose, beim galvanischen Krampf sowie beim physiologischen Elektrotonus am peripheren Nerven. Pflügers Arch. f. d. ges. Physiol., Bd. 249, Ss. 59-75.

Biol. Abstr. 23214, 1948.

Scheminzky, Ferdinand, and Fritz Gauster

1924. Beiträge zur physikalisch-chemischen Biologie der Forellenentwicklung. 1. Mitteilung. Die Schädigung der Membran des Forelleneies durch den elektrischen Strom. Arch. f. Mikr. Anat. u. Entw.-Mech., Bd. 101, Hefte 1-3, Ss. 1-39.

Scheminzky, Ferdinand, O. Hochstädt, and P. Adler

1936. Über das Wesen der Galvanonarkose beim Frosch. Pflügers Arch. f. d. ges. Physiol., Bd. 237, Ss. 284-294.

Scheminzky, Ferdinand, and F. K. Köllensperger

1938. Bildung erregbarkeitssteigernder Stoffe im Rückenmark des Frosches während elektrischer Durchströmung. Pflügers Arch. f. d. ges. Physiol., Bd. 241, Ss. 54-70.

Scheminzky, Ferdinand, and Friedrike Scheminzky

1926. Über die Wechselstromereinstellung bei einigen Ciliaten (Oscillotaxis). Pflügers Arch. f. d. ges. Physiol., Bd. 213, Ss. 112-118.

1931. Körpergrösse und Empfindlichkeit gegen den galvanischen Strom. Pflügers Arch. f. d. ges. Physiol., Bd. 228, Ss. 548-564.

Biol. Abstr. 24928, 1932.

1933. Nachweis polarer Durchlässigkeitssteigerung am elektrisch durchströmten Forellenei. Pflügers Arch. f. d. ges. Physiol., Bd. 232, Ss. 808-820.

1937. Wirkung des Wechselstromes auf ein- und mehrzellige Wassertiere. (Oscillotaxis, Fixation, und elektrische Betäubung.) Zeitschr. f. vergleich. Physiol., Bd. 25, Heft 2, Ss. 170-192. [Note: Publisher's date for entire Bd. 25 is 1938.]

- Scheminzky, Fe[rdinand], Fr[iedrike] Scheminzky, and F. Bukatsch
1941. Elektro-Taxis, Elektro-Tropismus, Elektro-Narkose und
verwandte Erscheinungen.
Tabulae Biologicae, Vol. 19, Pars 2, pp. 76-262.

Reprinted with change of title as follows:

1941. Elektro-Biologie. Die Wirkung des elektrischen Stromes auf
den Gesamtorganismus bei Pflanze, Tier und Mensch sowie ihre
pharmakologische Beeinflussung.
Dr. W. Junk, Den Haag, 1941. 198 Ss.

Schiemenz, Friedrich

- 1932a. Fischfang mit Elektrizität.
Fischerei-Zeitung, Bd. 35, Nr. 13, S. 157.

- 1932b. Holzers Arbeiten zum elektrischen Fischfang.
Fischerei-Zeitung, Bd. 35, Nr. 24, Ss. 284-285.

1953. Das Verhalten der Fische, insbesondere die Konkurrenz von
reflektorischen und psychischen Reaktionen, bei der Elektro-
fischerei.
Zeitschr. f. Fischerei, N. F. Bd. 1, Heft 5 u. 6, Ss. 369-372.

Schiemenz, Friedrich, and Karl Humburg

1939. Über den räumlichen Anwendungsbereich des elektrischen
Fischfanges.
Zeitschr. f. Fischerei, Bd. 37, Heft 3, Ss. 429-458.

Schiemenz, Friedrich, and Alfred Schönfelder

- 1927a. Elektrisches Fischen in nicht ablassbaren Gewässern.
Fischerei-Zeitung, Bd. 30, Nr. 1, S. 13.

- 1927b. Fischfang mit Elektrizität.
Zeitschr. f. Fischerei, Bd. 25, Heft 2, Ss. 161-187.

Schindler, Otto

1946. Betrachtungen nach der elektrischen Abfischung eines
Forellenbaches.
Allg. Fischerei-Zeitung, Jahrg. 71, Nr. 11, Ss. 11-12.

- *Schoonens, J. G.
1951. Electrisch vangen van vis.
Visserijwereld, Vol. 10, No. 16, pp. 12-13.
- Schubert, Kurt
1949. Electrocutation of whales.
U. S. Dept. Int., Fish and Wildl. Serv., Fishery Leaflet
No. 348, pp. 10-14.
- Schuck, Howard A.
1945. Survival, population density, growth, and movement of the
wild brown trout in Crystal Creek.
Trans. Amer. Fish. Soc., Vol. 73 (1943), pp. 209-230.
- Schumann, F.
1929. Fischfang mit elektrischem Strom in Westfalen.
Fischerei-Zeitung, Bd. 32, Nr. 22, S. 285; Nr. 50, S. 630.
- 1930a. Ein Beitrag zur Abfischung geschlossener Gewässer mit
elektrischem Strom.
Zeitschr. f. Fischerei, Bd. 28, Heft 2, Ss. 159-165.
- 1930b. Misslungenes elektrisches Fischen.
Fischerei-Zeitung, Bd. 33, Nr. 20, S. 261.
- *1931a. Anwendung von Elektrizität beim Fischfang.
Mitteil. d. Fischerei-Verein Westausgabe, Bd. 1, Ss. 197- ? .
- *1931b. Ein weiterer Beitrag zur Befischung geschlossener Gewässer
mit elektrischem Strom.
Mitteil. d. Fischerei-Verein Westausgabe, Bd. 1, Ss. 5- ? .
- *Senuma, Hideo
1929. The effect of electric current on fish.
Suisan Gakkwai Hô, Vol. 5, No. 2, pp. 201-219.

Biol. Abstr. 2898, 1933.
- Shetter, David S.
1947. The electric "shocker" and its use in Michigan streams.
Mich. Cons., Vol. 16, No. 9, pp. 8-10.

Smetanin, K.

1933. O materialakh po elektrolovu.

(Concerning data on electrofishing.)

Bull. of the Inst. of Fresh Water Fisheries (Leningrad),
Vol. 16, pp. 3-4. In Russian.

Translation on file, Branch of Fishery Biology, Fish and
Wildl. Serv.

Smith, G. F. M., and P. F. Elson

1950. A direct-current electrical fishing apparatus.

Can. Fish Cult., No. 9 (Dec. 1950), pp. 34-46.

Smolian, Kurt

1942. Neue Erfahrungen mit dem elektrischen Abfischapparat des
Landesfischereiverbandes Württemberg.

Allg. Fischerei-Zeitung, Jahrg. 67, Nr. 2, Ss. 13-16.

1944a. Die Elektrofischerei; ihr Zweck, die Methode ihrer Anwendung,
die Grenzen ihres Erfolges und ihre Gefahren nach dem
gegenwärtigen Stande unseres Wissens und den Ergebnissen der
Untersuchungen des vom Reichsverband der Deutschen Fischerei
gebildeten "Ausschusses für Elektrofischerei."
Fischerei-Zeitung, Kriegsgemeinschaftsausgabe, Bd. 47, Nrs. 11
u. 12, Ss. 41-44; Nrs. 13 u. 14, Ss. 50-52; Nrs. 17 u. 18,
Ss. 65-68; Nrs. 23 u. 24, Ss. 91-93.

Biol. Abstr. 11581, 1950.

*1944b. Die Elektrofischerei.

Sammlung fischereilicher Zeitfragen Herausgegeben von
Reichsverband der Deutschen Fischerei, Heft 35.

Neudamm und Berlin, 1944.

Solandt, D. Y.

1936. Conduction and excitation in nerve. The time-factors of ex-
citation.

Evans' Recent Advances in Physiology. 5th Ed., Chap. 8.

J. and A. Churchill Ltd., London, 1936. 500 pp.

Steinhausen, W.

1921. Über Stromdichtebestimmung und die Beziehung der Stromdichte zum Erregungsvorgang.
Pflügers Arch. f. d. ges. Physiol., Bd. 193, Ss. 171-200.

Tägtström, B. (Kisker)

1931. Fischerei mit Elektrizität in Harviks' Fischzuchtanstalt.
Fischerei-Zeitung, Bd. 34, Nr. 28, Ss. 354-355.

Also in: *Ny Svensk Fiskeritidskrift, No. 5 (Mar. 1, 1931),
pp. 44-47.

Tamura, Mitsuzo

1922. Denki o ôyôseru gyodô heisaku sôchi.
(Electric device for stopping the passage of fish.)
The Suisankai [Jour. of the Fisheries Society of Japan (Tokyo)],
1922, No. 476 (May), pp. 302-303. In Japanese.

Tauti [Tauchi], Morisaburô

1931. Ni tsuite.
(On the electric fish screen.)
Japanese Jour. Limnology, Vol. 1, No. 1, pp. 22-24. In
Japanese.

1932. A new form of electric fish screen.
Jour. of Imperial Fish. Inst. (Tokyo), Vol. 27, No. 1,
pp. 33-44.

1934. On the electric fish screen.
Proc. 5th Pac. Sci. Cong., Div. of Biol. Sci., Vol. 5 (1933),
pp. 3633-3635.

Tauti, Morisaburô, and Hideaki Yasuda

1932. Supplying of intermittent current to electric fish screen.
Jour. of Imperial Fish. Inst. (Tokyo), Vol. 27, No. 2,
pp. 55-62.

Teike, (?)

1937. Ueber elektrische Fischbetäubung.
Berliner Tierärztl. Wochenschr., Jahrg. 1937, Nr. 9, Ss. 137-
138.

Tester, Albert L.

- 1952a. Reaction of tuna and other fish to stimuli - 1951.
Part I: Background and summary of results.
U. S. Dept. Int., Fish and Wildl. Serv., Spec. Sci. Rept.:
Fisheries No. 91, pp. 1-7.

- 1952b. Reaction of tuna and other fish to stimuli - 1951.
Part V: Notes on the response of a tropical fish (Kuhlia
sandvicensis) to interrupted direct current.
U. S. Dept. Int., Fish and Wildl. Serv., Spec. Sci. Rept.:
Fisheries No. 91, pp. 69-83.

Thornton, W. M.

1931. Electrical perception by deep sea fish.
Proc. Univ. Durham Phil. Soc., Vol. 8, Part 4, pp. 301-312.

Biol. Abstr. 21051, 1933.

Tzonis, Konstantin

1937. Elektrometanarkose bei Fischen.
Anzeiger d. Kaiserlichen Akad. d. Wissensch. (Wien),
Mathemat.-Naturwiss. Klasse, Bd. 74, Heft 23, Ss. 201-202.

1938. Vergleichende Untersuchungen über Elektronarkose und
Elektrometanarkose bei Fischen.
Praktike, Akademia Athēnōn (Athens), Vol. 13, pp. 555-561.
In Greek with German summary.

Uzuka, Kiyoshi

1934. Some notes on the behavior of the catfish, Parasilurus
asotus, as seen through the responses to weak electric current.
The Sci. Repts. of the Tōhoku Imperial Univ. (Sendai, Japan),
Fourth Series (Biology), Vol. 8, No. 4, pp. 369-381.

Vietze, (?)

- 1927a. Die Elektrizität im Dienste der Fischzucht.
Elektrizitätswirtschaft, Jahrg. 26 (Mitteil. der VDEW
Nr. 433), Ss. 207-210.

1927b. Fischen mit Elektrizität.
Fischerei-Zeitung, Bd. 30, Nr. 22, Ss. 465-467.

Vietze, (?) (continued)

1927c. Kurzschluss im Fischteich.
Fischerei-Zeitung, Bd. 30, Nr. 18, S. 386.

1927d. Neue Fischfangversuche mit Hilfe der Elektrizität.
Fischerei-Zeitung, Bd. 30, Nr. 2, S. 36.

Volf, František

1953. Verwundung der Forellen beim Fang mittels elektrischen Stromes.
Sborník Československé akademie zemědělských ved (Prague),
Řada (Series) B, Vol. 26, Nos. 1 and 2 (Feb. 1953), pp. 109-
114. In Bohemian with Russian and German summaries.

Wagner, Richard, and Erik Wetterer

1949. Ein elektrisches Gerät zur Erzeugung rhythmischer linear ansteigender und abfallender Reizspannungen einstellbarer Steilheit sowie rechteckiger und anderer Reizspannungsformen.
Pflügers Arch. f. d. ges. Physiol., Bd. 251, Ss. 585-593.

Walch, Albert

1949. Die Einwirkung des elektrischen Stromes auf den Fisch bei der Elektrofischerei.
Allg. Fischerei-Zeitung, Jahrg. 74, Nr. 12, Ss. 213-216.
Biol. Abstr. 19472, 1951.

1950a. Die Gefahren und die Unfallverhütung bei der Elektrofischerei.
Allg. Fischerei-Zeitung, Jahrg. 75, Nr. 1, Ss. 18-20.

1950b. Die Geräte der Elektrofischerei.
Allg. Fischerei-Zeitung, Jahrg. 75, Nr. 15, Ss. 371-372;
Nr. 16, Ss. 391-394; Nr. 17, Ss. 414-416; Nr. 18, Ss. 438-439.

Wallengren, Hans

1903a. Zur Kenntnis der Galvanotaxis. I. Die anodische Galvanotaxis. II. Die kathodische Galvanotaxis.
Zeitschr. f. allg. Physiol., Bd. 2, Ss. 341-384.

- Wallengren, Hans (continued)
 1903b. Zur Kenntniss der Galvanotaxis. II. Eine Analyse der Galvanotaxis bei Spirostomum.
 Zeitschr. f. allg. Physiol., Bd. 2, Ss. 516-555.
- Wegner, Hans D.
 1948. Ein neues Elektro-Fischfanggerät.
 Allg. Fischerei-Zeitung, Jahrg. 73, Nr. 10, Ss. 85-88.
 Biol. Abstr. 11599, 1950.
- Welsh, T. J.
 1943. Electric fish screen saves steel.
 Electrical West, Vol. 90, No. 1 (Jan. 1943), pp. 37-38.
- Wilkening, (?)
 1926. Elektrischer Fischfang im Ausgleichweiher an der Mönnetalsperre.
 Allg. Fischerei-Zeitung, Jahrg. 51, Nr. 15, Ss. 242-244.
- Wöhlisch, Edgar
 1926. Untersuchungen über elastische, thermodynamische, magnetische und elektrische Eigenschaften tierischer Gewebe.
 Verhandl. d. Physikalisch-Medizinischen Gesellsch. zu Würzburg, N. F. Bd. 51, Ss. 53-64.
- Wolf, Ph.
 1947. Lax i Sverige och England.
 C. W. K. Gleerup, Lund, Sweden, 1947. 121 pp. (electro-fishing, pp. 22-23, 44-45.)
- Wood, E. J. Ferguson
 1949. Electric barrier impracticable.
 Fisheries Newsletter (Australia), Vol. 8, No. 6, p. 8.
- Yates, J. E.
 1930. Electric screens divert fish.
 Electrical World, Vol. 96, No. 5 (Aug. 2, 1930), pp. 216-217.

PART II

Typewritten and processed reports and other material having a
restricted distribution

[The source and/or present location of the following reports are indicated as completely as possible in the citations or in annotations; presumably all may be examined upon written request to the sponsoring agency.]

- Anon. ? Elektro-kescher (or: The handy catch apparatus for fishermen.)
Adv., Kreutzer-Peglow Co., Hamburg, Germany.
1938. The electric fish screen as tested on the Gold Hill Irrigation Canal, Gold Hill, Oregon, Summer 1937.
Fishtite Electric Screen Co., Mineo., 8 pp.

Copy on file, Fish and Wildl. Serv.
1939. Burkey electric fish screen.
Adv. (Description and diagrams), Electric Fish Screen Co.,
1130 N. Poinsettia Pl., Hollywood 46, Calif.
1941. Electric fish screen demonstration conducted for the California Division of Fish and Game by the Electric Fish Screen Company at Mt. Shasta, California.
Calif. Dept. Fish and Game, Typewr., 7 pp.

Copy on file, Fish and Wildl. Serv.
1943. Summary report of electric fish screen tests at Hat 2 Power House Intake, June and July, 1943.
Calif. Dept. Fish and Game, Typewr., 10 pp., subm. Sept. 29, 1943.

Copy on file, Fish and Wildl. Serv.
- Applegate, Vernon C., B. R. Smith, and W. L. Nielsen
1951. Development of an electromechanical sea lamprey weir and trap.
U. S. Dept. Int., Fish and Wildl. Serv., Great Lakes Fish. Invest., Progress Rept., Mineo., 5 pp.

Baker, Shirley

1930. Progress report of investigations on fish screens and fish ladders by U. S. Bureau of Fisheries.
Ann. Meeting of the Internat. Pacif. Salmon Federation,
Mar. 28-29, 1930, Typewr., pp. 20-22.

Baker, Shirley, and U. B. Gilroy

1931. Progress report for 1930 on the investigation of method and means of conserving fish life by means of proper fish screens and fish ladders.
U. S. Bur. Fish., Typewr., 53 pp., subm. Apr. 15, 1931.

Copy on file, Fish and Wildl. Serv.

1932. Progress report for 1931 on the investigation of method and means of conserving fish life by use of proper fish screens and fish ladders.
U. S. Bur. Fish., Typewr., 28 pp., subm. Jan. 1, 1932.

Copy on file, Fish and Wildl. Serv.

1933. Progress report for 1932 on the investigation of methods and means of conserving fish life by use of proper fish screens and fish ladders.
U. S. Bur. Fish., Typewr., 12 pp., subm. Mar. 15, 1933.

Copy on file, Fish and Wildl. Serv.

Barnett, G.

1936. A vacuum tube crest voltmeter.
U. S. Bur. Fish., Typewr., 23 pp.

Copy on file, Fish and Wildl. Serv.

Gilroy, U. B.

1929. (Electric fish screens.)
Proc. of Meeting of Exec. Comm. of Internat. Pacif. Salmon Invest. Federation, Vancouver, B. C., Apr. 5, 1929, Typewr., pp. 88-94.

Hatton, S. R., and G. H. Clark

1941. Tests on the electric fish screen at Lake Yosemite.
U. S. Dept. Int., Fish and Wildl. Serv., Typewr., 3 pp.

McMillan, F. O.

1929. The electrical characteristics of the Burkey electric fish diverter.
U. S. Bur. Fish., Typewr., 12 pp., subm. Feb. 7, 1929.

Copy on file, Fish and Wildl. Serv.

McMillan, F. O., and H. G. Barnett

1935. Preliminary report on U. S. Bureau of Fisheries electric screen investigation at Oregon State College.
U. S. Bur. Fish., Typewr., 17 pp., 7 figs., 2 tables.

Copy on file, Fish and Wildl. Serv.

McMillan, F. O., and Alton Everest

- *1937a. The design of an impulse generator for electric fish screen research.
U. S. Bur. Fish., Dittoed, ? pp.

Copy on file, Fish and Wildl. Serv.

- 1937b. Sixty-cycle, single- and three-phase electric fish screen.
U. S. Bur. Fish., Dittoed, 13 pp.

Copy on file, Fish and Wildl. Serv.

- 1937c. Summary of 1937 electric fish screen investigations.
U. S. Bur. Fish., Typewr., 9 pp.

Copy on file, Fish and Wildl. Serv.

McMillan, F. O., H. B. Holmes, and F. A. Everest

1937. The response of fish to impulse voltages.
U. S. Bur. Fish., Dittoed, 15 pp.

Copy on file, Fish and Wildl. Serv.

Siegfried, J. H.

1921. Experiments to determine efficiency of electric fish stop.
Typewr., 3 pp.

Copy on file, Fish and Wildl. Serv.

Smith, Andrew V.

1951. Some new proposals for electric fish screens.
Dept. Elec. Engineering, Oregon State Coll., Typewr.,
11 pp.

Copy on file, U. S. Army Corps of Engineers, Portland, Ore.

Volz, Charles D.

1951. The Magnetron panel.
U. S. Dept. Int., Fish and Wildl. Serv., No. Pacific
Fish. Invest., Processed, 2 pp., Aug. 1, 1951.

Weber, K. G., and C. D. Volz

- 1952a. Electroparalysis of chinook salmon.
U. S. Dept. Int., Fish and Wildl. Serv., Pacific Salmon
Invest., Processed, 6 pp., subm. Oct. 6, 1952.

- 1952b. Electroparalysis of chum salmon for spawntaking purposes.
U. S. Dept. Int., Fish and Wildl. Serv., Pacific Salmon
Invest., Processed, 4 pp., subm. Jan. 9, 1952.

Webster, Dwight A.

1950. Results of electric shocking demonstration in Fall Creek,
Ithaca, New York, May 16, 1950.
Dept. of Cons., Cornell Univ., Dittoed, 2 pp.

Webster, Dwight A., and Students

1953. A comparison of alternating and direct electric currents
in fishery work.
Dept. of Cons., Cornell Univ., Processed, 6 pp.

Wolf, Ph.

1948. Electrical fishing.
Typewr., 2 pp.

Copy on file, Fish and Wildl. Serv.

PART III

Patents granted by the United States Patent Office

[Patents are first listed in numerical order with date patented, inventor's name, and title of disclosure given for each entry; following this, an alphabetical index is presented. Copies of these patents may be obtained at nominal cost from the United States Patent Office, Washington, D. C.]

Numerical list

No. 794,573

Patented July 11, 1905

Inventor: Michael Ward
Title of disclosure: Apparatus for catching fish.

No. 855,588

Patented June 4, 1907

Inventor: Thomas N. Prudden
Title of disclosure: Method and apparatus for protecting marine wooden structures.

No. 978,872

Patented Dec. 20, 1910

Inventor: Charles K. Freer
Title of disclosure: Device for driving fishes.

No. 1,269,380

Patented June 11, 1918

Inventor: Henry T. Burkey
Title of disclosure: Electric fish-stop.

No. 1,292,246

Patented Jan. 21, 1919

Inventor: Henry T. Burkey
Title of disclosure: Electric fish-stop.

No. 1,486,083

Patented Mar. 4, 1924

Inventor: Charles Kaater Freer
Title of disclosure: Device for driving fishes.

No. 1,515,547

Patented Nov. 11, 1924

Inventor: Henry T. Burkey
Title of disclosure: Electric fish stop.

No. 1,838,981

Patented Dec. 29, 1931

Inventor: Jonas Edwin Anderson
Title of disclosure: Electrical fishing apparatus.

No. 1,882,482

Patented Oct. 11, 1932

Inventor: Henry Theodore Burkey
Title of disclosure: Fish diverter for irrigation ditches,
flumes, natural waterways, and the like.

No. 1,962,420

Patented June 12, 1934

Inventor: William J. Bradley
Title of disclosure: Electric insect exterminator.

No. 1,974,444

Patented Sept. 25, 1934

Inventor: Henry T. Burkey
Title of disclosure: Method of and apparatus for electrically
diverting fish.

No. 1,980,452

Patented Nov. 13, 1934

Inventors: Reuben S. Tice and Mary H. Littlefield
Title of disclosure: Fishing method and apparatus.

No. 2,010,601

Patented Aug. 6, 1935

Inventor: Donald H. Loughridge
Title of disclosure: Electric fish stop.

No. 2,146,105

Patented Feb. 7, 1939

Inventor: Lin E. Baker
Title of disclosure: Method and device for handling and con-
servation of fish and the like.

No. 2,163,282	Patented June 20, 1939
Inventor:	Knut Hovden
Title of disclosure:	Means for catching fish.
 No. 2,187,400	 Patented Jan. 16, 1940
Inventor:	Sam Palos
Title of disclosure:	Electrocuting trap.
 No. 2,193,915	 Patented Mar. 19, 1940
Inventor:	Lin E. Baker
Title of disclosure:	Apparatus for underwater electric barrier.
 No. 2,194,018	 Patented Mar. 19, 1940
Inventor:	Eugene Grooms
Title of disclosure:	Floodgate for electric fences.
 No. 2,233,045	 Patented Feb. 25, 1941
Inventors:	Franklin Samuel Bonner and Mort Roy Miller
Title of disclosure:	Electrical fish screen.
 No. 2,238,897	 Patented Apr. 22, 1941
Inventor:	Ramon Gomez
Title of disclosure:	Electrolytic fishing.
 No. 2,271,569	 Patented Feb. 3, 1942
Inventor:	Sam Palos
Title of disclosure:	Electrocuting trap.
 No. 2,426,037	 Patented Aug. 19, 1947
Inventors:	John R. Mahoney and Harry J. Bichsel
Title of disclosure:	Electronic control device for forming impulses.

Inventor: Leo T. Critchlow
 Title of disclosure: Eel trap.

Alphabetical index

Patentee	Patent Number
Anderson	1,838,981
Baker	2,146,105
Baker	2,193,915
Bonner et al	2,233,045
Bradley	1,962,420
Burkey	1,269,380
Burkey	1,292,246
Burkey	1,515,547
Burkey	1,882,482
Burkey	1,974,444
Critchlow	2,441,219
Freer	978,872
Freer	1,466,083
Gomez	2,238,897
Grooms	2,194,018
Hovden	2,163,282
Loughridge	2,010,601
Mahoney et al	2,426,037
Palos	2,187,400
Palos	2,271,569
Prudden	855,588
Tice et al	1,980,452
Ward	794,573

Acknowledgments

We wish to express our appreciation for the assistance rendered by many individuals who contributed references, provided corrections of citations, loaned originals or reprints of articles for examination, or otherwise assisted in the preparation of this bibliography. We are particularly indebted to the following persons: Miss Margaret I. Smith, Chief Reference Librarian, and Miss Mary E. Rollman of the staff of the University of Michigan Libraries for their assistance in securing the originals, or reproductions, of articles which were not available in that university library; Mr. Harlan B. Holmes for assistance in locating the originals of articles cited in his report on electric fish screens; Mr. Ellwood G. Johnson who assisted in the preparation of portions of the bibliography; and, Dr. Ralph Hile whose editorial advice guided the preparation of this report.

MBL WHOI Library - Serials



5 WHSE 01658

